



INTERIM

POLICIES AND BEST PRACTICES

MARINE MAMMAL STRANDING RESPONSE,
REHABILITATION, AND RELEASE

STANDARDS FOR REHABILITATION FACILITIES

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PURPOSE

The goal of this document is to set minimum facility, husbandry, and veterinary standards for rehabilitating marine mammals to optimize the success of releasing the animals back to the wild. Likewise some of the standards put forth in this document are based on the USDA Animal Welfare Act regulations which define minimum standards for captive marine mammals and on expert input from a 1998 workshop hosted by NMFS in Miami, FL. Other issues are addressed such as health and safety of personnel involved in the rehabilitation and contingency planning. **As part of the National Marine Fisheries Service (NMFS) Stranding Agreement, the Agency will require that all rehabilitation facilities meet the Minimum Standards presented in this document.**

Recommended Standards (shaded in gray) are included in some sections, and consist of facility design and operational suggestions for optimizing the rehabilitation success rate. Meeting or exceeding the recommended standards may be considered a goal to strive towards when upgrading existing, or designing new facilities or protocols.

It is the intent of NMFS to provide a reasonable process for facilities to be upgraded to meet the minimum standards set forth in this document. Substandard facilities may be improved using funds that may be available through the John H. Prescott Rescue Assistance Grant Program (Prescott Grant). Likewise Prescott Grant funds may also be used to improve facilities that meet minimum standards with the goal to achieve or exceed the recommended standards.

The purpose of rehabilitation is to provide humane care for stranded marine mammals and to optimize the success of releasing the animals back to the wild. As mandated by Title IV Section 402 (a) of the Marine Mammal Protection Act, NMFS has developed guidance and criteria for release based on optimizing the chances for survival and minimizing the risk to wild populations (NMFS/FWS BEST PRACTICES for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release). By subscribing to these standards, NMFS hopes to achieve the criteria set out by the standards for release.

CHAPTER 1

STANDARDS FOR CETACEAN REHABILITATION FACILITIES

SECTION 1: FACILITIES, HOUSING, AND SPACE

Pools for stranded cetaceans must be appropriate for the basic needs of the animal including keeping the skin moist, to providing buoyancy, and aiding thermoregulation. Debilitated cetaceans often cannot swim and may require assistance when first introduced to a rehabilitation pool. Cetaceans arriving in a debilitated condition may have needs requiring smaller pools than those that are able to swim and dive upon arrival. Choice of pool size may be important and is case specific. Although chances of survival may be improved if animals capable of swimming are given larger space, deeper pools may make it more difficult and stressful to catch an animal for feeding, hydration, and treatment. Likewise with multiple strandings, grouping animals by size, ability to swim, species, and health status may improve overall survival rates. Placing the larger, more robust animals in separate pools or swimming areas away from the smaller, less dominant and/or more debilitated animals may enhance the success of the rehabilitation efforts for the weaker animals. Species of cetaceans known to be social in nature should be housed with other compatible species. Social compatibility should be considered an important part of appropriate housing. Animals should be closely monitored when introduced to a pool and carefully evaluated for social compatibility.

It is up to the attending veterinarian and experienced rehabilitation staff, as defined in Section 6.0 (the definition of which is referenced in the interim NMFS Minimum Standard Qualifications for a Marine Mammal Stranding Program Agreement (New Applicants and Renewals) to decide how to house the animal most appropriately based on their observations and physical examination.

Each animal admitted to a rehabilitation center should be placed in a quarantine holding area and have a full health evaluation performed by the attending veterinarian. Sufficient quarantine time should be allowed for results from tests and cultures to be evaluated before the animal is placed with animals that are apparently disease free. Cetaceans with evidence of infectious disease must be quarantined (See Section 3.0 Quarantine).

During mass or multiple unusual stranding situations such as hazardous waste spills, catastrophic weather events, toxic algal events, or other events leading to unusually high morbidity, rehabilitation center personnel may need to adjust the number of animals that would be normally housed in each pool, bay or ocean pen. The attending veterinarian is responsible for assuring that the number of animals housed in one pool or pen will be appropriate based on the situation. The number of animals housed should be determined not only by the amount of pool space and size of the animals, but also by the number of qualified personnel available on a per animal basis. The recommended number of personnel to animals less than 250 kg is 3:1 for critical care cetaceans and 1:2 once stabilized. Larger critical care cetaceans will require more personnel per animal.

Unweaned neonate cetaceans shall not be admitted for rehabilitation without prior approval of NMFS. Unweaned cetaceans, once rehabilitated, are frequently not suitable for release or require stringent release criteria to ensure humane treatment and a successful outcome. Prior to receiving an unweaned cetacean calf for rehabilitation, facility personnel must submit a disposition plan to the NMFS regional coordinator which will include options and a timeline for decisions regarding disposition. In addition the plan will include options and criteria for release, considerations for permanent care, and euthanasia to the NMFS regional coordinator.

NMFS Regulation, U.S.C. 50 CFR 216.2(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR “is an activity that provides opportunity for the public to view living marine mammals at a facility holding marine mammals captive.” (See Section 12 Viewing).

1.1 SPACE REQUIREMENTS for pool, bay, or ocean pens.

MINIMUM STANDARD

- All pools or pens must be deep enough for animal(s) to float and submerge and shall be available for all rehabilitating cetaceans. The diameter and depth of the pool for critical care animals is at the discretion of the attending veterinarian.
- Pool depth for non-critical animals (animals able to swim unassisted) must equal one-half the body length or 0.9 meters (3 feet), whichever is greater.
- Pools shall have a minimum horizontal dimension (MHD) of 7.3 meters (24 feet) or two times the actual length of the largest species housed in the pool, whichever is greater.
- Animals housed longer than 6 months must be provided with pools at least 1.5 meters (5 feet) deep and must meet the USDA APHIS Animal Welfare Act (AWA) MHD standards unless otherwise directed by the attending veterinarian. This should be documented and justified with a signed veterinary statement in the medical records.

RECOMMENDED:

- Pools shall have a depth equal to the body length or 1.8 meters (6 feet), whichever is greater.
- Pools shall have a minimum horizontal dimension of 9.75 meters (32 feet) or two times the average adult length of the largest species in the pool, whichever is greater.

1.2 POOL OR PEN DESIGN

Pools or pens designed to maximize the ease of handling, and to limit the amount of time the cetacean spends out of water for husbandry or veterinary procedures may help to decrease the stress of handling for that animal. Pools designed with a deep and a shallow end work well because the cetaceans may stay in the deep end while the pool level is dropped. The animal requiring treatment may be moved to the shallow end and immediately placed back in the deep end when the treatment has been completed. Pools equipped with a false bottom that can be lifted are ideal because the animal can be caught quickly without dropping the level of the pool water and the animal may be immediately returned to the pool once treatments have been

completed. False bottoms in bay or ocean pens will facilitate capture, since there is no convenient way to drop the water level in those situations. Pools equipped with lift-bottoms and/or multi-level pools are recommended, however lift bottoms must be carefully designed when being retrofitted to existing pools.

Scoop-net or trampoline methods may also be used for capture, where a net is placed on the pool or pen bottom under the swimming animal and it is lifted by multiple personnel using tag lines. While this method is an inexpensive alternative to a false floor it may not be suitable for multiple or large animals.

Pools should also be designed to minimize introduction of anthropogenic noise from life-support equipment or other sources. This can be accomplished through sloping of walls, insulation with soil or other materials around the sides of the pool and/or through isolation of noise-generating equipment.

MINIMUM STANDARD

- Any shape pool that meets minimum space standard
- Construction materials:
 - Open water pens shall optimally be constructed of plastic or other rigid netting.
 - If cotton or nylon netting material is used it must be small enough gage to prevent entanglement.

RECOMMENDED

- Pools with long axes that provide relief from constant turning while swimming.
- Pools designed to promote good water circulation and to minimize anthropogenic noise.
- Pool designs:
 - Single depth pool with false bottom that can be lifted
Or
 - Pool with a sloping bottom where the water level may be dropped in the shallow end to facilitate treatment
Or
 - Single or multi-depth pool with an adjoining “med pool” with a false bottom that can be lifted
Or
 - Ability to drop a pool in less than 2 hours and refill it to a “swimming level” in less than 30 minutes

1.3 SHELTER, SHADING AND LIGHTING

Rehabilitation facilities located where there is inclement weather need to provide shelter to rehabilitating animals that may be exposed to extreme heat or cold. Cetaceans held in rehabilitation facilities may not have normal activity levels and thin animals may be unable to thermoregulate properly. These animals may require shade structures to protect them from direct sunlight and extreme heat, or shelter to protect them from extreme cold.

Animals held in indoor facilities should be provided with appropriate light and dark cycles. Light provided in indoor facilities shall be of sufficient intensity to clearly illuminate the pool.

MINIMUM STANDARD

- Shade structures or shelters must be provided to animals when local climatic conditions could compromise the health of the animal.
- Shade structures, where necessary, shall be large enough to provide shade to at least 50% of the minimum horizontal dimension (MHD) surface area determined for the species held in the pool. MHD is defined as 7.3 meters (24 feet) or two times the actual length of the largest species housed in the pool, whichever is greater.
- Lighting should be appropriate for the species.

RECOMMENDED

- Full spectrum lights or a natural source of lighting for animals housed indoors.
- Removable or adjustable shade structures in pens to provide more natural sunlight to animals that are swimming and diving normally.

1.4 CRITICAL CARE ANIMALS AND CALVES; Special requirements

Debilitated and ill cetaceans are often sedentary and tend to float at the surface for long periods of time. Some are unable to swim and dive. Some may require support in order to stay afloat enough to breathe regularly. Young calves may be weak and require assistance. Support may be provided by floatation devices attached to the animal or rehabilitation personnel supporting the animal utilizing a variety of methods. A shallow area that allows the animal to rest on the bottom while keeping its blowhole above the surface may also suffice. This shallow resting shelf must be of sufficient depth for larger animals (over 50 kg) to provide adequate buoyancy to prevent organ-crushing. Small cetaceans may also be supported in a stretcher that is hung within an open aluminum frame while maintaining the water depth at the midline of the animal. These animals must be protected from sun-related skin damage by providing them with shade or covering their exposed skin with an appropriate, non-desiccating sun block that allows proper thermoregulation. Exposed skin may be protected from desiccation with the use of emollients applied to the skin or a water spray.

MINIMUM STANDARD

- Ensure support is available via floatation devices, a shallow resting shelf, sloping beach, suspended stretcher system, or other support for critically ill or neonatal cetaceans that are weak and/or cannot swim normally.
- Monitor animals requiring support.
- Provide sufficient shade.
- Provide a water spray or method for keeping skin moist for cetaceans that cannot swim or dive.

- Control air temperature above the pool between 50 – 80° F when appropriate to facilitate recovery, protect rehabilitating animals from heat or cold extremes, and prevent discomfort.

1.5 NUMBER OF ANIMALS HOUSED IN EACH POOL

During mass or unusual mortality event (UME) strandings the number of cetaceans received by the facility is limited not only by the number and size of the holding pools or pens, but the number of qualified trained rehabilitation staff members available to care for the animals. Due to the intensive 24 hour assistance required for critical care cetaceans, a minimum of two qualified trained staff members are necessary for each and every dependent cetacean on the premises. The maximum number of animals maintained in each pool and onsite at the facility shall be determined by the attending veterinarian and dictated by the number of qualified staff available to care for the animals.

MINIMUM STANDARD

- Provide enough pool space for each animal to swim, dive, and maintain an individual distance of one body length from other animals housed in the same pool.
- Provide 2 qualified trained rehabilitation staff members for every critical care or dependent cetacean weighing less than 250 kg. Larger critical care cetaceans will require more personnel to handle each animal.
- Provide one trained staff member for every three cetaceans undergoing less critical periods of rehabilitation; during reconditioning or during counter-conditioning if training or desensitization was used for feeding stations, medical procedure desensitization or transport approximations.

RECOMMENDED

- Provide enough pools or pool space to house multiple animals in accordance with the calculated space outlined in the APHIS Animal Welfare Act standards for captive cetaceans.
- Provide three qualified trained rehabilitation staff members for every critical care or dependent cetacean.
- Provide one trained staff member for every two cetaceans undergoing less critical periods of rehabilitation; during reconditioning; or prior to reintroduction.

1.6 HOUSEKEEPING

MINIMUM STANDARD

- Keep support buildings and grounds as well as areas surrounding rehabilitation pools clean and in good repair.
- Maintain perimeter fences in good repair, and ensure they are an adequate height and construction to keep people, animals, and pests out.
- Ensure primary enclosures housing marine mammals do not have any loose objects, sharp projections, and/or edges which may cause injury or trauma to the marine mammals contained therein.

- Objects introduced as environmental enrichment must be too large to swallow and made of non porous cleanable material that is able to be disinfected. Likewise items such as rub ropes shall be secured to prevent entanglement.
- All drains and overflows must have screened covers.
- Ensure there are no holes or gaps larger than ½ the size of the head diameter of the calf of the smallest species to be housed.

RECOMMENDED

- Coat all pool surfaces and areas surrounding pools with a non porous cleanable material that is able to be disinfected.

1.7 PEST CONTROL**MINIMUM STANDARD**

- Establish and maintain a safe and effective program for the control of insects, avian and mammalian pests. This should include physical barriers to prevent feral and/or wild animals from contact with the rehabilitating animals.
- Insecticides or other such chemical agents shall not be applied in a primary enclosure housing marine mammals or a food preparation area except as authorized in writing by the attending veterinarian.
- If applied, all appropriate measures must be taken to prevent direct contact with the insecticide/pesticide, whether airborne or waterborne, by the animal.

1.8 SECURITY FOR FACILITY

Stranded marine mammals often attract public attention and must be protected from excessive commotion and public contact. Ensuring a quiet stress-free environment for rehabilitating animals may improve their chance of survival. Public viewing of marine mammals is discussed in Section 12 of this document.

MINIMUM STANDARD

- Locate rehabilitation facilities at sites that are able to be secured from the public.
- Prevent direct public contact with the rehabilitating animals but utilizing appropriate fencing, staff and security personnel.

RECOMMENDED

- Maintain 24-hour monitoring when animals are present

SECTION 2 WATER QUALITY

Water quality is an essential part of keeping cetaceans healthy. Sick or debilitated cetaceans should be housed in pools filled with clean, appropriately treated saltwater to facilitate their recovery.

There are four basic types of water systems:

- Pools with filtration systems (closed systems)
- Pools without filtration systems (dump and fill systems)
- Pools with periodic influx of natural seawater (semi-open systems)
- Open water systems (flow-through pools, bay or sea pens)

There are a number of variables which will affect water quality. The number and size of cetaceans utilizing each pool will vary throughout the year at most rehabilitation facilities. During unusual stranding events the number of cetaceans utilizing one pool may increase dramatically, creating a heavier load of waste which must be handled by the filtration system in closed systems and by the amount of water flow-through in semi-open and open systems.

Filtration, or life support systems are essential to maintaining clean water for animals held in closed or semi-closed systems. Life support systems have three basic parts; mechanical filters that remove solids, biological filters or baffles to remove or detoxify chemicals in the water, and disinfecting methods to control or remove pathogens. In addition to maintaining clean water in the animal pools, these systems may be needed to treat waste water, depending on waste water disposal requirements. If a temporary increase in waste production overwhelms part or all of the life support system, a good water quality control program will require alternative options.

The source of water used in closed systems generally is fresh water obtained from municipal sources whereas water in open and semi-open systems comes from a bay or sea source. Municipal fresh water must have salt added to increase the salinity to appropriate levels to maintain cetaceans. Water in closed systems must be regularly filtered through sand and gravel filters to remove particulate matter, and disinfectants such as chlorine or bromine are added at appropriate levels to eliminate pathogens. More elaborate systems utilize ozone to oxidize pathogens in the water.

Factors that affect water quality are:

- Size of pool or pen
- Efficiency of filtration system or water flow-through rate (tides)
- Water turnover rate
- Number, size and species of animals housed in pool or pen
- Nature and amount of food consumed by animals in pool or pen
- Nature of bottom substrate
- Frequency of cleaning the pool
- Types, amounts, and the frequency with which chemicals are added to the system
- Temperature of the water
- Pathogens in the water
- Biotoxins in open water pens or in pools where the source water comes from the ocean or bay
- Contaminants (oil, pesticides, etc.) in open water pens
- Hazardous waste spills
- Inclement weather

- Sunlight contributing to algae production on pool surfaces, which in turn can support bacteria

SOURCE AND DISPOSAL OF WATER

The water source for cetaceans housed in closed or semi-closed systems may be municipal water, well water, or water brought into the facility from an adjacent body of water or estuary.

MINIMUM STANDARD

- Salt water must be readily available to fill pools housing rehabilitating cetaceans unless otherwise directed by the attending veterinarian.
- Fresh water must be available to clean and wash down surrounding areas.
- Drain water from pools daily, or as often as necessary to keep the pool water quality within acceptable limits.
- Discharge waste water in accordance with state or local regulations. Facility managers must seek appropriate authorization to dispose of waste water. Documents of authorization or necessary permits must be kept on site as part of the administrative record and may be requested by NMFS as part of the NMFS Stranding Agreement.
- Chemicals, when necessary, shall be added in appropriate amounts to disinfect the water or adjust the pH, but not added in a manner that could cause harm or discomfort to the animals.
- Provide contingency protocols describing how water quality will be maintained during periods of peak animal use.

RECOMMENDED

- Enough salt water must be available to completely fill pools within two hours of draining.
- Maintain a filtration system designed to optimize water quality in each holding pool and decrease water waste

2.2 WATER QUALITY TESTING

It is important to test the water in which the animals live on a regular basis. Coliform bacterial counts are used to monitor the efficiency of the filtration system to eliminate potentially harmful bacteria. Coliform counts should be done at least once per week and more frequently if there are very large or multiple animals utilizing the pool. While coliform numbers may be described as Most Probable Number (MPN) per 100 ml, a more accurate method of measuring coliforms is to determine the total coliform count, or the fecal coliform count.

Temperature of the water is especially important if the animal lacks the ability to thermoregulate. Water may require heating or chilling to aid debilitated animals in their ability to maintain optimal body temperature. Water temperature regulation is not feasible in open water pens, but keeping track of the water temperature in sea pens may aid the staff in making husbandry decisions.

If coliform counts or the water temperature become too high in any system, measures must be taken to correct the problem in a timely manner. A partial-to-total water change may be necessary to correct the problem in a closed or semi-closed system. If the coliform counts are

considered too high in sea or bay pens, efforts should be made to circulate clean sea water through the pens using pumps, paddles or other methods of moving water.

Chemicals added to the water may damage eyes and skin, therefore levels must be monitored daily. Emergency chemicals should be on hand such as sodium thiosulfate in case of the accidental hyperchlorination of a system. Salinity may also have an impact on the health of the skin and eyes, as well as the comfort level of the animal, and should be monitored regularly.

2.2.1 Water quality tests

MINIMUM STANDARD

- Measure coliform growth weekly.
- Total coliform counts must not exceed 500 per 100 ml or a most probable number (MPN) of 1000 coliform bacteria per 100 ml water. Fecal coliform counts are not to exceed 400 per 100 ml.
- If the above tests yield results that exceed the allowable bacterial count, then two subsequent samples must be taken to repeat the test(s) where the level(s) is/are exceeded. The second sample is to be taken immediately after the initial test result, while the third sample would be taken within 48 hours of the initial test.
- If the averaged value of the three test results still exceeds the allowable bacterial counts, the condition must be corrected immediately or the animals must be moved to a contingency facility.
- Maintain pH between 6.5 and 8.5.
- Maintain salinity between 24 - 35 ppt.
- Maintain the temperature of the water so that it falls within parameters appropriate for the species.
- Measure oxidant levels in systems which require use of a chemical disinfectant and/or ozone in the system (for closed systems).

RECOMMENDED

- Maintain PH between 7.2-8.2
- Total Coliforms with blanks and controls, fecal Coliform, fecal Strep, and yeast count performed at least weekly.

2.2.2 Frequency of testing in closed, semi-open, or open systems

MINIMUM STANDARD

- Measure water temperature, pH, salinity, chemical additives (if applicable) daily in all pools.
- Measure coliform counts weekly; and more frequently at the discretion of the attending veterinarian.

RECOMMENDED

- If ozone systems are used, measure ozone levels regularly in the animal pools. Ozone levels shall not exceed 0.02 mg/liter

- Test source and discharge water at least once per day or more frequently for “flow through” systems
- Maintain records for tests with time, level and results – reviewed and signed monthly by the attending veterinarian.

2.3 CHEMICAL ADDITIVES

Total chlorine = Free chlorine + combined chlorine.

MINIMUM STANDARD

- Maintain total chlorine below 1.5 ppm, where the combined chlorine shall not exceed 50% of the total chlorine.
- All additives must be recorded.
- The pH may be adjusted chemically – for example – pH may be raised with sodium carbonate, or soda ash; or lowered with HCl or CO₂; but not added in a manner that could cause harm or discomfort to the animals.
- Maintain Material Safety Data Sheets (MSDS) and clear signage as well as protocols for appropriate handling equipment for the addition of chemicals.

2.4 WATER CIRCULATION

The amount of water turnover through the filtration system in a closed or semi-open system is important to maintain water quality by removing organic waste and particulate matter. Likewise the amount of water movement through an open water pen is also important in the maintenance of water quality. Generally, adequate tidal action will result in the equivalent of two complete water changes per day.

MINIMUM STANDARD

- Maintain sufficient turnover of water through the filtration system in closed or semi-open systems to keep the water quality at or above acceptable limits, with a minimum of two complete water changes per day.
- Ensure methods for moving water (water paddles, pumps, spray devices) are available to aerate and move water in open water pens with insufficient flow of tides or water through the enclosures. These methods should be sufficient to provide the equivalent of two water changes per day.

RECOMMENDED

- A minimum full water turnover rate of every four hours for each pool in closed or semi-open systems.

2.5 SALINITY

Acceptable salinity levels are dependant on the species and condition of the cetacean and the duration of the stay. Most species of cetaceans require a salinity level greater than 24 ppt in order to maintain healthy skin and eyes. Occasionally the attending veterinarian may chose to house the cetacean in fresh or nearly fresh water for a period not exceeding 3 days. Reasons for

maintaining cetaceans in fresh or brackish water should be noted in the veterinary record and signed by the veterinarian. Some species of cetacean are better adapted to live in brackish water and may do well in lower salinity levels than other species.

MINIMUM STANDARD

- Maintain salinity levels over 24 ppt unless a written veterinary plan calls for lower salinity levels, or if the animals are housed in sea pens nearby their resident range.

RECOMMENDED

- Ideal salinity levels should approach natural ocean salinity levels (30 – 33 ppt) but acceptable industry standards suggest maintaining cetaceans in water with salinity levels over 24 ppt.

2.6 pH**MINIMUM STANDARD**

- Maintain pH in a range between 6.5 to 8.5

RECOMMENDED

- Maintain pH between 7.2 –8.2

2.7 WATER TEMPERATURE

Many species of cetaceans are adapted to maintain normal body temperatures when living in a broad range of water temperatures. Healthy *Tursiops* have been housed successfully in water ranging from 50°F to 80° F. Atlantic Whitesided dolphins fail to thrive in water over 80° F and north-Atlantic harbor porpoise do best in 45 to 65° F. Some warmer water species such as a Vaquita will require consistent warm water environments. It is therefore important to know if the species being rehabilitated comes from a polar, temperate or tropical climate. It is of equal importance to know the temperature range of water in their primary habitat. Young, underweight, and debilitated animals may also require warmer water than found in their primary habitat.

Cetaceans such as bottlenose dolphins adjust their blubber thickness seasonally in response to water temperature. This must be considered when readying rehabilitated animals for release. Therefore animals should be acclimated to an appropriate seasonal water temperature prior to release.

MINIMUM STANDARD

- Hold water temperatures within the normal seasonal habitat temperature range for the species under rehabilitation unless otherwise authorized by the attending veterinarian in writing.
- Provide methods to heat and maintain warm water environments for species that require it, or for debilitated individuals that are incapable of maintaining appropriate body temperature.
- Monitor the temperature of water being heated or cooled
- Design water systems to minimize the chance of rehabilitating cetaceans from becoming hyperthermic or hypothermic.

RECOMMENDED

- Monitor blubber thickness ultrasonically.

SECTION 3 QUARANTINE

Cetaceans brought to a rehabilitation facility have no medical history and may carry diseases communicable to other marine mammals, other animals, or humans. Likewise, these animals are often debilitated and may suffer from a variety of illnesses which may compromise their own immune systems making them susceptible to diseases from other animals and/or the rehabilitation environment. Quarantine facilities must be available and quarantine protocols must be in place for all incoming animals at rehabilitation facilities. NMFS/FWS Release Standards, policies, regulations (U.S.C. 50 CFR 216.27) and the terms and responsibilities under the NMFS Stranding Agreement must be followed whenever animals are released back to the wild.

Direct contact between the general public and cetaceans undergoing rehabilitation should be avoided because of the zoonotic risk from pathogens carried by marine mammals. There have been documented cases of *Brucella*, *Erysipelothrix*, and *Blastomyces* being passed from cetaceans to humans. There are numerous other marine mammal diseases and potentially zoonotic pathogens listed on the following website (see <http://www.vetmed.ucdavis.edu/whc/mmz/>).

See also: *2004 UC Davis Wildlife Health Center Report for the Marine Mammal Commission – Assessment of the Risk of Zoonotic Disease Transmission to Marine Mammal Workers and the Public: Survey of Occupational Risks*

MINIMUM STANDARD

Maintain sufficient quarantine facilities and space for appropriate quarantine of incoming animals or for holding animals with contagious diseases.

3.1 Prevention of animal to animal transmission of diseases

- Have separate filtration and water flow systems for pools in quarantine/isolation areas.
- Use dedicated protective clothing for personnel.
- Use foot baths, glove baths, and methods to disinfect clothing, wet suits, or exposure suits between handling animals within quarantine area and outside of quarantine area.
- Maintain equipment and tools strictly dedicated to the quarantine areas
- Provide dividers between pens and pools that prevent washdown or splash from moving from one pool to another.
- Quarantine all new animals in a separate quarantine area and have pens/pools that can be isolated from the rest of the animal housing areas.
- Provide sufficient space; ideally greater than 20 feet or 6 meters; or solid barriers between animal enclosures to prevent direct contact – including splashed pool water and airborne disease transmission.

- Ensure sufficient air turnover in indoor facilities to prevent transmission of disease.
- Implement specific quarantine and sanitation procedures to prevent transmission of disease through fomites (personnel, clothing, equipment).
- Thoroughly clean and disinfect buckets, hoses, scales, transport equipment, and cleaning equipment that is moved between animal areas to prevent transmission of disease via fomites.
- Place open water pens so effluent is not near water intake.
- Require evaluation and written veterinary approval before placing animals together after quarantine period has been met.

RECOMMENDED

- Provide separate air handling system in indoor facilities.
- Clean and disinfect quarantine pools between uses.

3.2 Prevention of domestic animal to marine mammal transmission of disease

- Ensure appropriate fencing and placement of holding pens prevents direct contact between rehabilitating cetaceans and domestic animals.
- Prohibit personal pets from entering the facility and facility grounds. Pets must stay outside the perimeter fence at all times.
- Place foot baths at the entry and exit of animal areas.
- Require quarantine and sanitation protocols are followed to prevent transmission of disease through fomites such as wet suits and equipment.

3.3 Prevention of wild animal to marine mammal transmission of disease

- Ensure perimeter fencing will prevent wildlife from entering the rehabilitation premises.
- Provide appropriate rodent and bird control on the premises.
- Ensure net pens and lagoon areas have sufficient secondary fencing to keep wildlife from coming in direct contact with the animals housed in the net pens.

3.4 Prevention of marine mammal to domestic animal transmission of disease

- Provide appropriate perimeter fencing.
- Require animal personnel to change contaminated clothing and/or disinfect before leaving the rehabilitation premises.
- Require that specific quarantine and sanitation procedures are taken to prevent transmission of disease through fomites such as clothing and equipment.

3.5 Prevention of stranded marine mammal to captive marine mammal transmission of disease

- Train volunteers and staff to follow appropriate quarantine protocols
- Establish quarantine protocols that take into consideration the changing status of the stranded animal.

- Establish traffic flow so that volunteers or staff working with stranded animals do not inadvertently travel into a collection animal area
- Establish decontamination protocols before volunteers or staff members exposed to stranded animals may enter a collection animal area.
- Establish separate restrooms, showers, changing rooms, food preparation areas, etc. for staff and volunteers working with rehabilitating vs. collection animals.

3.6 Reduce probability of the spread of disease from animals housed in open sea/bay pens

- Consider substrate, water depth and public access when selecting a site for a sea or bay pen.
- Place pens in a secluded area where wild animals and marine mammals are unlikely to come into direct contact with the animals housed in the sea/bay pens; nets should be sufficiently rigid to prevent entanglement by mammals or fish.
- Place a second set of perimeter nets 10 meters from the sea/bay pens to prevent direct contact with wild marine mammals
- Do not place sea/bay pens within 1000 meters of any major outflow of storm drains or sewage treatment plants and consider the flow direction or current from these major outflows.
- Place the sea/bay pens over 500 meters, and downstream from water intake pipes that bring water into facilities that house marine mammals
- Place pens in an area where there is ample flow-through of tides/currents
- Ensure the pens are of sufficient size to minimize pathogen build-up. Each cetacean should be housed in a pen that has a minimum depth of half of their body length, and a minimum horizontal dimension of 24 feet or two full body lengths, whichever is greater.
- Avoid overcrowded pens. Animals may fight with each other when housed too closely together. Likewise they must be able to swim and dive normally to maintain optimal muscle condition.
- Have equipment to pump or aerate the water in pens that do not have sufficient tidal action to ensure a minimum of two complete water changes per day
- Place pens in areas where there is sufficient depth to enhance water circulation and reduce pathogen build-up. Daily coliform testing will determine if pathogen build-up exists.
- Place quarantine pens such that tidal action or underwater currents will not flow through sea pens housing healthy animals.

3.7 Evaluation requirements before placing marine mammals together

- Obtain CBC/Chemistries, appropriate cultures, physical examination before moving animals out of quarantine area.
- Review current NMFS recommendations on diseases of concern (i.e. Morbillivirus) and reportable disease (i.e. Brucella and West Nile virus).
- Consider screening for morbillivirus, herpesvirus, Brucella, Leptospira, and Toxoplasma.
- If animals are part of an Unusual Mortality Event (UME), then screening for diseases must be more thorough and in direct coordination with NMFS and through UME coordinators.

- Have contingency plan for animals that are carriers of or actively infected with reportable disease such as brucellosis, herpesvirus, leptospirosis, toxoplasmosis, and morbillivirus

3.8 Zoonotic considerations

- Restrict public access and direct contact with cetaceans due to zoonosis potential and public health hazard of non-trained individuals interacting with sick and injured marine mammals.
- Train staff and personnel about how to prevent contracting zoonotic diseases.
- Train staff and personnel working directly with stranded cetaceans how to recognize symptoms of zoonotic disease.
- Provide safety equipment such as protective clothing, eye protection and face masks.
- Provide eye flushing stations as used with HAZMAT or normal saline bottles to irrigate the eyes.
- Staff with open wounds shall not enter the pool of animals carrying potentially infectious diseases.
- Persons with disabilities, respiratory conditions, infectious diseases or infectious skin conditions shall not enter pools with rehabilitating cetaceans.
- Train staff on the basics of sanitation and properly handling contaminated equipment.

3.9 Pre-release guidelines

- Pre-release health screens and serologic requirements are directed by the NMFS Regional Stranding Coordinator, in coordination with Marine Mammal Health and Stranding Response Program.

SECTION 4.0 SANITATION

4.1 Primary enclosure sanitation

MINIMUM STANDARD

- Remove animal and food waste in areas other than the rehabilitation pool from the rehabilitation enclosure at least daily, and more often when necessary to prevent contamination of the marine mammals contained therein and to minimize disease hazards.
- Remove particulate animal and food waste from rehabilitation/exercise pools at least once daily, but as often as necessary to maintain water quality and to prevent increased health hazards to the marine mammals that use the pools.
- Remove trash and debris from pools as soon as it is noticed, to preclude ingestion or other harm to the animals.
- Clean the walls and bottom surfaces of the rehabilitation/exercise pools as often as necessary to maintain proper water quality.
- Prevent animals from coming in direct contact with disinfectants or aerosolized disinfectants from spray or cleaning hoses.

RECOMMENDED

- Empty and allow pools to dry once each year but dry and hyperchlorine pool bottoms and walls after each use by sick cetaceans.

4.2 Sanitation of food preparation areas and food receptacles

- Use separate food preparation areas and supplies for rehabilitation vs. collection animals.
- Clean food containers such as buckets, tubs, and tanks, as well as utensils, such as knives and cutting boards, or any other equipment which has been used for holding, thawing or preparing food for marine mammals after each feeding with detergent and hot water and sanitize with an appropriate disinfectant approved for use in food areas at least once a day.
- Clean kitchens and other food handling areas where animal food is prepared after every use, and sanitize at least once weekly using professionally accepted sanitation practices.
- Store substances such as cleaning and sanitizing agents, pesticides and other potentially toxic agents in properly labeled containers away from food preparation areas.
- Post Material Safety Data Sheets (MSDS) “right to know” documents for staff utilizing cleaning and animal treatment chemicals and drugs.

SECTION 5.0 FOOD HANDLING AND PREPARATION

During rehabilitation food for marine mammals shall be wholesome, palatable, free from contamination, and of sufficient quantity and nutritive value to allow the recovery of the animals to a state of good health. Live fish may be fed during rehabilitation but preferences should be given to native prey species. Live fish may contain parasites which could infect compromised animals. Feeding regimens should simulate natural patterns in terms of frequency and quantity to the extent possible while following a prescribed course of medical treatment. Most cetaceans feed repeatedly during a given day.

5.1 Diets and Food Preparation

MINIMUM STANDARD

- Prepare the diets with consideration for age, species, condition, and size of marine mammals being fed.
- Feed cetaceans a minimum of three times a day, except as directed by a qualified veterinarian or when following professionally accepted practices.
- Diets reviewed by a nutritionist or a veterinarian.
- Train staff to recognize good and bad fish quality.
- Feeding live fish may be required for release determination. See NMFS Release Guidelines for more information regarding feeding live fish.
- Food receptacles should be cleaned and sanitized after each use. Food preparation and handling should be conducted so as to minimize bacterial or chemical contamination and to ensure the wholesomeness and nutritive value of the food.

RECOMMENDED

- Feeding patterns should simulate natural patterns in terms of frequency and quantity which may require food to be offered 5 – 10 times daily.

5.2 Food Storage and Thawing

MINIMUM STANDARD

- Frozen fish or other frozen food shall be stored in freezers which are maintained at a maximum temperature of 0°F (-18°C).
- The length of time food is stored and the method of storage, as well as the thawing of frozen food should be conducted in a manner which will minimize contamination and which will assure that the food retains optimal nutritive value and wholesome quality until the time of feeding.
- Freezers should only contain fish for animal consumption. Human food or specimens should not be placed in the fish freezer.
- Experienced staff should inspect fish upon arrival to ensure there are no signs of previous thawing and re-freezing, and check temperature monitoring devices in the transport container. Fish should be refused if temperature fluctuations occurred during transport.
- Freezers shall be of sufficient size to allow for proper stock rotation.
- All foods shall be fed to the marine mammals within 24 hours following the removal of such foods from the freezers for thawing.
- If the food has been thawed under refrigeration it must be fed to marine mammals within 12 hours of complete thawing.
- When fish is thawed in standing or running water, cold water must be used to prevent excess bacterial growth.
- To ensure optimal quality of the fish, and to prevent bacterial overgrowth, do not allow fish to reach room temperature or sit in direct sunlight.
- The thawed fish shall be kept iced or refrigerated until a reasonable time before feeding. This time will vary with ambient temperature.
- Prepared formula should be fed immediately or refrigerated and fed to the marine mammals within 24 hours of preparation. Formula, once heated to an appropriate temperature for a feed, shall be discarded if it is not consumed within one hour.

RECOMMENDED

- Calculate kilocalories of each type of fish or food items fed to each animal daily
- Conduct food analysis for protein, fat and water content of each lot of fish used
- Culture the slime layer from the fish lot prior to thawing for *Erysipelothrix*

5.3 Supplements

MINIMUM STANDARD

- Each animal shall receive appropriate vitamin supplementation which is sufficient and approved in writing by the attending veterinarian.

5.4 Feeding

MINIMUM STANDARD

- Food, when given to each marine mammal individually or in groups, must be given by personnel who have the necessary training and knowledge to assure that each marine mammal receives and eats an adequate quantity of food to maximize its recovery or maintain good health. Such personnel is required to recognize deviations in each animal being rehabilitated such that intake can be adjusted and/or supplemented accordingly.

5.5 Public feeding

MINIMUM STANDARD

- Public feeding of animals that are being rehabilitated is strictly prohibited.
- Feeds may be conducted only by qualified, trained personnel.

5.6 Feed records

MINIMUM STANDARD

- Maintain feed records on each individual animal noting the actual (not an estimate) individual daily consumption for each animal by specific food type.
- Weigh food before and after each feeding and the record the amount consumed.
- Obtain girth measurements at least weekly at the level of the axilla and the anterior insertion of the dorsal fin. Girth measurements are generally less stressful to obtain than weighing the animal.

SECTION 6.0 VETERINARY MEDICAL CARE

All rehabilitation facilities shall have an attending veterinarian. The attending veterinarian is critically involved in making decisions regarding medical care as well as housing and husbandry of resident and incoming cetaceans

6.1 Veterinary Experience

MINIMUM STANDARD

The attending veterinarian shall:

- Be available to examine animals on a regular schedule and emergency basis; daily if necessary.
- Be available to answer veterinary questions on a 24 hour basis.
- Have marine mammal experience or be in regular consultation with a veterinarian who has marine mammal experience.
- Be licensed in the state where they are practicing.
- Have access to a list of expert veterinarians to contact for assistance.
- Have a minimum skill level and be able to draw blood from, and give injections to the species most commonly encountered at the rehabilitation center.
- Be available to examine animals immediately upon admittance to a facility.
- Be available to assess animals during a mass stranding.

- Have contingency plan for veterinary backup.
- Have a drug license and the ability to obtain necessary medications for the animals housed at that rehabilitation facility.
- Be able to conduct a full post-mortem examination on all species of cetaceans treated at the facility.
- Be knowledgeable and able to perform cetacean euthanasia.
- Be knowledgeable about species-specific pharmacology.
- Must certify in writing that animals scheduled for release are likely to survive and are free of known communicable diseases.
- Must certify in writing that animals are fit for transport.

RECOMMENDED - All of the above plus

- Membership in the International Association for Aquatic Animal Medicine
- Have access to the most recent edition of the CRC “Handbook of Marine Mammal Medicine”
- Complete a course which offers basic medical training with marine mammals such as Seavet, Aquavet or MARVET.
- Have a minimum of one year of clinical veterinary experience post graduation.
- Have at least one year clinical experience working with the marine mammal type(s) most frequently admitted to the rehabilitation facility
- Be full time employees or contracted veterinarian of record at facilities managing over 10 cetacean cases per year

6.2 Veterinary Program**MINIMUM STANDARD**

- Veterinary care for the animals must comply with the State Veterinary Practice Act for the state in which the facility is located.
- Veterinary care of the animals must be performed by, or under the supervision of a veterinarian as determined by the State Veterinary Practice Act.
- Standard operating procedures shall be reviewed and signed off by the veterinarian every 6 months and may be reviewed by NMFS as part of the NMFS Stranding Agreement or as part of inspections.
- Staff caring for animals should be sufficiently trained to assist with veterinary procedures under the direction of the veterinarian.
- Institutions must abide by all relevant laws governing veterinary medicine.
- Veterinary decisions shall be based on “best practices” based on informed veterinary opinion and experts in cetacean medicine.
- Submit a schedule of implementation of veterinary care which includes a review of husbandry records, visual and physical examinations of the animals, and a visual inspection of the facilities.

- A health and safety plan for the staff shall be written and accessible at all times. It shall be reviewed by the veterinarian annually and may be required as part of the NMFS Stranding Agreement.
- The following reports may be requested annually by NMFS as required under the NMFS Stranding Agreement or as a part of inspections:
 - SOP reviews,
 - Health and Safety Plan reviews,
 - Animal acquisitions and dispositions,
 - NOAA Form 89864, OMB#0648-0178 (Level A data),
 - NOAA Form 89878, OMB#0648-0178 (Marine Mammal Rehabilitation Disposition Report),
 - Case summaries for any rehabilitation performed at a facility, including narrative descriptions of the cases as well as spreadsheets of treatments, blood values, etc.

SECTION 7.0 LABORATORY TESTS AND FREQUENCY OF TESTING

Recommendations for tests will be issued each year by the NMFS stranding coordinator in each region as outlined in the Marine Mammal Health and Stranding Response Program. NMFS must be provided adequate time and information including a veterinary certificate of health before an animal is released as directed in 50 CFR 216.27 (see NMFS release guidelines).

7.1 Laboratory Testing

MINIMUM STANDARD

- CBC/Serum Chemistry - All animals shall have a minimum of two blood samples drawn for CBC with differential and serum chemistry upon admission and prior to release (see NMFS/FWS Standards for Release).
- Fecal analysis for parasites - Fecal tests for parasites shall be run upon admission of each animal at the discretion of the attending veterinarian.
- Serology as necessary for release determination based on direction of the NMFS stranding coordinator and the Marine Mammal Health and Stranding Program and for additional clinical diagnosis as deemed appropriate by the attending veterinarian.
- The administration of drugs with potential adverse side-effects may require additional testing. For example, the use of ototoxic antibiotics may require subsequent testing of hearing abilities of the animal prior to consideration for release.
- The attending veterinarian or a trained staff member shall perform a complete necropsy on every animal that dies within 24 hours of death.
- Perform histopathology on select tissues from each animal that dies.
- Culture and other diagnostic sampling shall be conducted as directed by the attending veterinarian to determine the cause of stranding or death
- Contact NMFS for additional laboratory test requirements in all cases of unusual mortality events or disease outbreaks. More complete testing may be required for diseases of concern.

- Serologic assays may only go to labs that have validated tests approved by NMFS, especially for release decisions or determination.
- Notify NMFS within 24 hours of diagnosis of reportable diseases.

RECOMMENDED

- Complete necropsy performed by the attending veterinarian or a pathologist.
- Full histopathology done on tissues from each animal that dies of apparent infectious disease,
- Bank 1cc of serum per blood draw in -80° F freezer
- Bank heparinized plasma (green top) tube in -80° F one per animal
- Reproductive status shall be evaluated upon admission and prior to release through analysis of serum progesterone and estrogen levels in females, and testosterone in males. Elevated hormone values in females upon admission will require re-sampling within the first two weeks to assess pregnancy. Monitoring by means of monthly blood sample collection and analysis through the course of rehabilitation is strongly advised. If possible, sampling will be done in conjunction with ultrasonic examination of reproductive tracts.

SECTION 8.0 RECORD KEEPING AND DATA COLLECTION

Record keeping is an essential part of the rehabilitation process. Not only do accurate and complete medical records for each stranded cetacean allow the staff to provide consistent and optimal care for each animal, but retrospective records help scientists and veterinarians to make better evaluations on how to treat individuals as well as more accurate population health assessments.

8.1 Record Keeping

MINIMUM STANDARD

- Record and report the “Marine Mammal Stranding Report - Level “A”.
- Complete the required NMFS Marine Mammal Rehabilitation Disposition Report NOAA 89-878, OMB #0648-0178, as in accordance with the NMFS Stranding Agreement.
- Maintain and update individual medical records daily on each animal at the rehabilitation center.
- Individually identify each animal with unique field number.
- Keep an accurate description of the animal, including identification/tag number, date and location of stranding, sex, weight, and length at stranding.
- Subjective, objective, assessment and plan (SOAP) based records are preferred.
- Include food intake and medication administered to each animal in the daily records.
- Frequency of Weight Measurements:
 - Recorded weekly for underweight cetacean calves or as authorized in writing by the attending veterinarian.
 - Taken as often as possible for underweight animals without causing undue stress to the animal.

- Recorded on admission and prior to release for larger cetaceans.
- Measure body weight, girths (axilla and anterior insertion of the dorsal fin) and standard straight-line and length upon admission, and within one week of release/placement.
- Measure blubber thickness (ultrasonically) at standard sites upon admission, and monitor monthly throughout the course of rehabilitation, with a goal of matching blubber to seasonal water temperatures.
- Weigh the animal as practical, keeping in mind that obtaining the weight of the animal may be stressful.
- Record all treatments, bloodwork, test and results and daily observations in the medical records.
- Maintain individual medical records for each animal. Medical records remain on site where the animal is housed and are available for NMFS review upon request as stated in the NMFS Stranding Agreement.
- Maintain medical records on site for a minimum of 15 years.
- Maintain up to date water quality records.
- Maintain life support system maintenance records.
- Maintain records of water quality additives.

RECOMMENDED

- Full set of standard morphometrics prior to release.
- Photographic documentation, identifying marks, lesions.
- Caloric value of daily food intake calculated and recorded for each animal each day.
- Daily weight of calves or emaciated animals at the discretion of the attending veterinarian.
- Maintain food acquisition and analysis records.
- Maintain “paper copy” archive of required NMFS records.

8.2 Data Collection**MINIMUM STANDARD**

- Written documentation of the medical history, food and observation records must be kept.
- NMFS Required Forms to be completed:
 - Marine Mammal Stranding Report – Level A (NOAA 89-864, OMB #0648-0178)
 - Marine Mammal Rehabilitation Disposition Report (NOAA 89-878, OMB #0648-0178)

RECOMMENDED

- Computerized documentation with hard copies.
- Ability to network with other institutions.
- Maintain real-time accessible compiled comparative data.

SECTION 9.0 EUTHANASIA PROTOCOLS

MINIMUM STANDARD

- Each institution must have a written euthanasia protocol signed by the attending veterinarian.
- Persons administering the euthanasia must be knowledgeable and trained to perform the procedure.
- Maintain a list of individuals authorized to perform euthanasia signed by the veterinarian.
- Euthanasia shall be performed in a way to minimize distress in the animal.
- Refer to both American Veterinary Medical Association euthanasia standards and the CRC Press Handbook of Marine Mammal Medicine.
- Appropriate drugs for euthanasia in appropriate amounts for the largest species admitted to the facility shall be maintained in stock on site in an appropriate lockbox or under the control of a licensed veterinarian with a current DEA license.
- Drugs for euthanasia shall be kept with an accurate inventory system in place.
- DEA laws and regulations and State Veterinary Practice Acts must be followed when using controlled drugs.
- NMFS may request this information (protocols and DEA #) as part of the NMFS Stranding Agreement.

SECTION 10.0 HEALTH AND SAFETY PLANS FOR PERSONNEL

There shall be a health and safety plan on site at each rehabilitation facility that identifies all health and safety issues that may be factors when working closely with wild marine mammals.

MINIMUM STANDARD

- Identify all potential zoonotic diseases in a written document available to all personnel.
- Include safety plans for the direct handling of all species and sizes of cetaceans seen at that facility.

SECTION 11.0 CONTINGENCY PLANS

Contingency plans shall be in place at each facility and may be required by NMFS as part of the NMFS Stranding Agreement. NMFS may require approved variances or waivers prior to planned projects such as construction, and NMFS may not allow rehabilitation efforts to occur under some circumstances. These plans should address in detail the operation of the facility and care of the animals under the following conditions:

- Inclement weather plan, including a hurricane/big storm plans where appropriate;
- Construction in the vicinity of the animal rehabilitation pools recognizing the potential and documented adverse impacts of construction on cetaceans, and including specific reference to how noise, dust, debris, and construction worker access will be controlled, how and how frequently animal health will be monitored, and specific criteria for when construction shall be halted or the animals will be moved to another site out of the construction area if the animals appear to be adversely impacted;
- Power outages, including plans of how to maintain frozen fish stores and life support systems;

- Water shortages;
- “Acts of God” plan which may include floods, earthquakes, hurricanes or other unpredictable problems known to occur on occasion in the region where the facility is located.

SECTION 12.0 VIEWING

NMFS Regulation, U.S.C. 50 CFR 216.2(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR “an activity that provides opportunity for the public to view living marine mammals at a facility holding marine mammals captive”. Only remote public viewing will be allowed and only when there is no possible impact of the public viewing on the animals being rehabilitated. A variance will be required by NMFS for facilities planning to offer public viewing of any cetaceans undergoing rehabilitation.

SECTION 13.0 TRAINING AND DECONDITIONING/COUNTER-CONDITIONING BEHAVIORS

Basic behavioral conditioning of wild cetaceans for husbandry and medical procedure may be warranted during rehabilitation as long as every effort is made to limit reinforced contact with humans. Such conditioning may reduce stress for the animal during exams and acquisition of biological samples, as well as improve the ability to assess the appetite and ensure each animal in a group receives the appropriate amount and type of diet and medications.

In some cases, extensive contact with humans, including training, may benefit resolution of the medical case by providing mental stimulation and behavioral enrichment, and may facilitate medical procedures. The relative costs and benefits of training should be evaluated by the staff veterinarian, and the likelihood of contact with humans following release should be considered.

Behavioral conditioning of cetaceans must be done for the shortest time necessary to achieve rehabilitation goals and is to be eliminated prior to release such that association of food rewards with humans is diminished. If an animal has become accustomed to hand-feeding or boat-following, the animal may approach humans after release. Therefore, these behaviors should be deconditioned or counter-conditioned before the animals can be considered for release. Most behaviors will extinguish through lack of reinforcement, but some may require more concentrated efforts. The success of deconditioning can be assessed through observations of the extinguishing of undesirable behaviors.

Training for research that is above and beyond the scope of normal rehabilitation practices can be approved on a case-by case basis under a NMFS scientific research permit. An exception can be made if the attending veterinarian, facility, and NMFS officials all agree that the research will not be detrimental to the animals' health and welfare and will not impede their ability to be successfully released back to the wild.

CHAPTER 2

STANDARDS FOR PINNIPED REHABILITATION FACILITIES

1.0 FACILITIES, HOUSING, AND SPACE

Pools for stranded pinnipeds must be appropriate for the basic needs of the animal including buoyancy and thermoregulation. Debilitated pinnipeds often cannot swim and will avoid water if offered, preferring a haul-out space to a pool. Pinnipeds arriving in a debilitated condition have different needs and may not require pools initially. If no pool is provided to the animal, means of keeping it at a temperature between 60 – 80°F and protected from direct sunlight is essential.

Social compatibility should be considered as a part of appropriate housing. Pinnipeds known to be social should be housed with compatible species whenever possible. Placing larger, more robust animals in separate pens, away from the smaller, weaker, or less dominant animals may enhance the success of the rehabilitation efforts for the weaker animals.

It is up to the attending veterinarian and experienced rehabilitation staff, as defined in Section 6.0 (the definition of which is referenced in the interim NMFS Minimum Standard Qualifications for a Marine Mammal Stranding Program Agreement (New Applicants and Renewals) to decide how to house the animal most appropriately based on their observations and physical examination.

Each animal admitted to a rehabilitation center should be placed in a quarantine holding area and have a full health evaluation performed by the attending veterinarian. Sufficient quarantine time should be allowed for results from tests and cultures to be evaluated before the animal is placed with animals that are apparently disease free. Pinnipeds with evidence of infectious disease must be quarantined (See Section 3.0 Quarantine)

During mass, multiple or unusual stranding situations such as hazardous waste spills, catastrophic weather events, toxic algal exposure, or other events leading to unusually high morbidity or mortality, rehabilitation centers may need to adjust the number of animals that would be normally housed in each pen, pool, or bay or ocean pen. The attending veterinarian will be responsible for assuring that numbers of animals housed in one pool or pen will be appropriate based on the situation. The number of qualified animal care personnel available to care for the animals could be a limiting factor on how many animals may be housed at each facility.

Care should be taken when hand rearing neonatal otariids, as some species frequently imprint on their caregivers rendering them unsuitable for release. A disposition plan should be in place in advance for pinniped pups that are ultimately deemed unreleasable.

NMFS Regulation, U.S.C. 50 CFR 216.2(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR “is an activity that provides opportunity for the public to view living marine mammals at a facility holding marine mammals captive.” (See Section 12 Viewing).

1.1 Pool requirements

MINIMUM STANDARD

- Pools shall be available for all pinnipeds under rehabilitation. Critical care animals may be temporarily held without water access at the discretion of the attending veterinarian.
- Pools shall be deep enough for each animal to completely submerge, and shall be at least 0.91 meters or 3 feet deep. An exception to this would be temporary pools for young pups or debilitated animals.
- Pools shall be large enough in diameter to allow each animal housed therein to swim.

RECOMMENDED

- Pools shall have a minimum horizontal dimension (MHD) of 1 meter or 1.5 x the length of the largest animal utilizing the pool, whichever is larger.
- The minimum surface area of the pool shall be at least equal to the dry resting area required by USDA APHIS Animal Welfare Act (AWA) standards except for ill animals or young pups at the discretion of the veterinarian.
- The pool shall be at least 0.91 meters deep or ½ the actual length of the longest species contained therein, whichever is greater. Parts of the pool that do not meet the minimum depth requirement cannot be used in the calculation of the dry resting and social activity area, or as part of the MHD or required surface area of the pool.
- Facilities where numerous pinnipeds are rehabilitated consistently each year should be equipped with at least one pool and haul-out area that meet APHIS standards for at least one adult of the species where one or more per year strands as adults. If adult pinnipeds are commonly rehabilitated, facilities should be designed to accommodate at least the average number of adult-sized animals that strand each year.

1.2 Dry Resting Area

MINIMUM STANDARD

- 1 to 2 animals - area of dry resting area = 2 x (length of the longest animal)²
- Three or more animals in the same enclosure require the minimum space for two animals and, in addition, enough space for the animals to lay separately with at least one body length from one another, to turn around completely, and to move at least two body lengths in one direction.
- The facility must have the ability to house adult males separately from one another.
- Animals may be temporarily housed in smaller areas at the discretion of the veterinarian. Minimum space required will be appropriate for the age or medical condition of the animal.
- Critical care animals and young pups may be temporarily supplied smaller pools and less dry resting area.-

RECOMMENDED

- Three or more animals in the same enclosure: (length of each animal) 2 x number of animals in enclosure = number of square feet of required dry resting area (DRA).

1.3 Pool or Pen Design

Pools should also be designed to minimize introduction of anthropogenic noise from life-support equipment or other sources. This can be accomplished through sloping of walls, insulation with soil or other materials around the sides of the pool and/or through isolation of noise-generating equipment.

MINIMUM STANDARD

- Pools or pens shall be designed for ease of cleaning and handling the animals.
- Open water pens shall optimally be constructed of plastic or other rigid netting.
- If cotton or nylon netting material is used it must be small enough gage to prevent entanglement.

RECOMMENDED

- Pools designed to promote good water circulation and to minimize anthropogenic noise.
- Ability to drop a pool in less than 2 hours and refill it to a “swimming level” in less than 30 minutes

1.4 Length of stay and how it affects space:

Facilities which handle adult animals that are kept for periods longer than six months but less than one year should meet USDA APHIS AWA standards. However the actual length of each animal may be used for each DRA calculation rather than the adult length. After one year holding must meet APHIS standards.

1.5 Shelter, Shading, and Lighting

Animals housed at rehabilitation facilities must be provided with shelter to prevent exposure to extreme heat or cold. Pinnipeds held in rehabilitation facilities may not have normal activity levels and thin animals may be unable to thermoregulate properly. These animals may require shade structures to protect them from direct sunlight and extreme heat, or shelter to protect them from cold temperatures or inclement weather. Animals held in indoor facilities should be provided with appropriate light and dark cycles.

MINIMUM STANDARD

- Provide shade structures or shelters to animals to aid thermoregulation when local climatic conditions could compromise the health of the animal.
- Provide shade and/or water spray to all pinnipeds that cannot swim and are housed in areas where ambient air temperatures reach > 80 degrees F (26.6 degrees C).
- Lighting in indoor facilities shall be appropriate for the species and shall clearly illuminate the DRA and pool during daylight hours.

RECOMMENDED

- Provide all of the above, and a source of natural or full spectrum light for animals housed indoors.
- Install removable or adjustable shade structures in pens to provide more natural sunlight to animals that are swimming and diving normally.

1.6 Air Temperature

MINIMUM STANDARD

- Air temperature must be regulated between 50-80°F to facilitate recovery, protect rehabilitating animals from extremes of heat or cold, and to prevent discomfort.
- Provide a method to raise or lower air temperature, as appropriate to maintain proper body temperature should be available.

RECOMMENDED

Provide temperature-controlled shelter or holding space for critical care animals or pups.

- Monitor temperature of additional heaters such as heating pads infrared heaters and heat lamps. Animals should be able to move away from point source heaters. If animals are too debilitated to move, temperature of heaters can not exceed the safe range of 50-80°F at skin surface or animals must be monitored every 4 hours.

1.7 Housing for Critical care animals:

Debilitated and ill pinnipeds are often sedentary and haul out or float at the surface of a pool for long periods of time. Young pups may be weak and require assistance moving in and out of pools. A shallow area that allows the animal to rest on the bottom with gradually sloping sides or a ramp equipped with a gripping surface to allow ease in entering and exiting the pool are considered optimal.

MINIMUM STANDARD:

- Individual dry haul out space or individual enclosures shall be appropriate in size for the most common species of pinnipeds rehabilitated routinely at the facility.
- Provide housing for critically ill animals that will provide shelter from the extremes of heat or cold, and will provide heat as appropriate for animals held in cold climates.
- Provide access to shallow water and/or water spray for all pinnipeds as advised by the attending veterinarian.
- Provide a structurally separate facility to quarantine incoming animals until the attending veterinarian determines them to be free from contagious disease. (See Section 3 Quarantine).

RECOMMENDED All of the above minimum standards plus:

- Individual enclosures for each critical care animal where the dry resting area = (length of the animal)²
- Housing which provides optimal temperature control for critically ill animals (heating and/or air conditioning).

1.8 Housing of Pups

Pups of all species have special housing and management needs and require careful monitoring when introducing them to pools. Premature pups may require more time than full-term pups before introducing them to water.

MINIMUM STANDARD

Phocids less than 1 week old

- Individual housing with fully supervised access to shallow water (< 0.5 meters deep) pools. Full supervision may stop when animals demonstrate ability to swim and haul out.

Otariids less than 3 weeks old

- Individual housing or housing with similarly sized pups with fully supervised access to shallow water pools (< 0.5 meters deep) Full supervision may stop when animals demonstrate ability to swim and haul out.
- Access to raised Platforms in dry resting areas for pups of all ages so they are not required to lay on concrete or other hard/cold surfaces. Platforms must be low enough for easy access yet high enough to allow the floor to dry under platform. Platforms should be made of material with a sealed cleanable surface and designed to allow for waste to pass through.

RECOMMENDED

- All of the above, and with pools designed with a gently sloping side/beach area with “gripping surface” to allow pups to easily haul out without assistance.

1.9 Housing of Older Pups

Full term phocids greater than 1 week old and otariids greater than three weeks old

MINIMUM STANDARD

- House pups with similar conspecific age group
- House pups as individuals or groups with frequent or constant access to deeper water (> 0.5 meters deep).
- Provide a platform or shallow shelf in each pool that allows pups to easily haul out on their own.
- Provide platforms in dry resting areas allowing pups an alternative to laying on concrete or other hard/cold surfaces (as above).

RECOMMENDED

- Provide a pool designed with a gently sloping side leading to a level beach area that allows pups to easily haul out.

1.10 Number of Animals Housed in Each Pen/pool

During mass or unusual mortality event (UME) strandings the number of pinnipeds received by the facility is limited not only by the number and size of the holding pools or pens, but the

number of qualified trained rehabilitation staff members available to care for the animals. The maximum number of animals maintained in each pool and onsite at the facility shall be determined by the attending veterinarian and dictated by the number of qualified staff available to care for the animals.

MINIMUM STANDARD

- Provide a minimum of three qualified trained rehabilitation staff members on site for the first 25 pinnipeds housed at the facility, and two more trained rehabilitation staff members for every additional 25 pinnipeds. More staff will be required when animals are housed simultaneously in quarantine holding and recovering animal holding areas.

1.11 Housekeeping

MINIMUM STANDARD

- Keep support buildings and grounds as well as areas surrounding rehabilitation pools clean and in good repair.
- Maintain perimeter fences in good repair, and ensure they are an adequate height and construction to keep people and animals and pests out.
- Ensure primary enclosures housing marine mammals do not have any loose objects, sharp projections, and/or edges which may cause injury or trauma to the marine mammals contained therein.
- Ensure that there are no holes or gaps larger than $\frac{1}{2}$ the size of the head diameter of the pup of the smallest species to be housed.
- All drains and overflows must have screened covers.
- Objects introduced as environmental enrichment must be too large to swallow and made of non porous cleanable material.

RECOMMENDED

- Coat all pool and haul-out surfaces with a non-porous, cleanable material that is able to be disinfected.

1.12 Pest Control

MINIMUM STANDARD

- Establish and maintain a safe and effective program for the control of insects, avian and mammalian pests. This should include physical barriers to prevent feral and/or wild animals from contact with the rehabilitating animals.
- Insecticides or other such chemical agents shall not be applied in a primary enclosure housing marine mammals or a food preparation area except as authorized in writing by the attending veterinarian.
- If applied, all appropriate measures must be taken to prevent direct contact with the insecticide/pesticide, whether airborne or waterborne, by the animal.

1.13 Security for Facility

Stranded marine mammals often attract public attention and must be protected from excessive commotion and public contact. Ensuring a quiet stress-free environment for rehabilitating

animals may improve their chance of survival. Public viewing of marine mammals is discussed in Section 12 of this document.

MINIMUM STANDARD

- Locate rehabilitation facilities at sites that are able to be secured from the public.
- Prevent direct public contact with the rehabilitating animals by utilizing appropriate fencing, staff and security personnel.

RECOMMENDED

- Maintain 24- hour monitoring when animals are present

2.0 WATER QUALITY

There are four basic types water systems:

- Pools with filtration systems (closed systems)
- Pools without filtration systems (dump and fill systems)
- Pools with periodic influx of natural seawater (semi-open systems)
- Open water systems (Bay or sea pens)

There are a number of variables which will affect water quality. The number and size of pinnipeds utilizing each pool will vary throughout the year at most rehabilitation institutions. During the busy season or during unusual stranding events, the number of pinnipeds utilizing one pool may increase dramatically creating a heavier load of waste which must be handled by the filtration system in closed systems and by the amount of water flow-through in semi-open and open systems. A life support system is used as one tool in a program of water quality maintenance to provide safe and clean water to the animals.

Filtration, or life support systems are essential to maintaining clean water for animals held in closed or semi-closed systems. Life support systems have three basic parts; mechanical filters that remove solids, biological filters or baffles to remove or detoxify chemicals in the water, and disinfecting methods to control or remove pathogens. In addition to maintaining clean water in the animal pools, these systems may be needed to treat waste water, depending on waste water disposal requirements. If a temporary increase in waste production overwhelms part or all of the life support system, a good water quality control program will require alternative options.

Water used in closed systems generally is fresh water obtained from municipal sources, whereas water in open and semi-open systems comes from a bay or sea source. Water in closed systems must be regularly filtered through sand and gravel filters to remove particulate matter, and disinfectants such as chlorine or bromine may be added to eliminate pathogens. More elaborate systems utilize ozone to oxidize pathogens in the water.

Factors that affect water quality are:

- Size of pool or pen
- Efficiency of filtration system or water flow-through rate (tides)
- Water turnover rate

- Number, size and species of animals housed in pool or pen
- Type and amount of food consumed by animals in pool or pen
- Nature of bottom substrate
- Frequency of cleaning the pool
- Types, amounts, method and the frequency with which chemicals are added to the system
- Temperature of the water
- Pathogens in the water
- Biotoxins in open water pens or in pools where the source water comes from the ocean or bay
- Contaminants (oil, pesticides, etc.) in open water pens
- Hazardous waste spills
- Inclement weather
- Sunlight contributing to algae production on pool surfaces, which in turn can support bacteria

2.1 Water Source and Disposal

The water source for pinnipeds housed in closed or semi-closed systems may be municipal water, well water, or water brought into the facility from an adjacent body of water or estuary.

MINIMUM STANDARD

- Fresh or salt water must be readily available to fill pools, and fresh water to clean and wash down holding pens daily.
- Drain water from pools daily, or as often as necessary to keep the pool water quality within acceptable limits.
- Discharge waste water in accordance with state or local regulations. Facility managers must seek appropriate authorization to dispose of waste water. Documents of authorization or necessary permits must be kept on site as part of the administrative record and may be requested by NMFS as part of the NMFS Stranding Agreement.
- Chemicals, when necessary, shall be added in appropriate amounts to disinfect the water or adjust the pH, but not added in a manner that could cause harm or discomfort to the animals.
- Provide contingency protocols describing how water quality will be maintained during periods of peak animal use.
- Water will be clear enough to see animals and bottom of pool and free from obvious solid waste and noxious odors.

RECOMMENDED

- Fresh or ideally salt water must be available to fill pools within two hours of draining.
- Maintain a filtration system designed to optimize water quality in each holding pool and decrease water waste.
- Have the ability to dechlorinate fresh water for species which require this (i.e. fur seals).
- Provide protocols for maintenance of water quality throughout the year.
- Test source and discharge water.

2.2 Water Quality Testing

It is important to test the water in which the animals live on a regular basis. Coliform bacterial counts are used to monitor the efficiency of the filtration system to eliminate potentially harmful bacteria. Coliform counts should be done at least once per week and more frequently if there are very large or multiple animals utilizing the pool. While coliform numbers may be described as Most Probable Number (MPN) per 100 ml, a more accurate method of measuring coliforms is to determine the total coliform count, or the fecal coliform count.

Temperature of the water is especially important if the animal lacks the ability to thermoregulate. Water may require heating or chilling to aid debilitated animals in their ability to maintain optimal body temperature, although debilitated pinnipeds are likely to haul out, in such case the water temperature becomes less important. Water temperature regulation is not feasible in open water pens, but keeping track of the water temperature in sea pens may aid the staff in making husbandry decisions. If coliform numbers or the water temperature becomes too high in any system, measures must be taken to correct the problem in a timely manner. A partial-to-total water change may be necessary to correct the problem in a closed or semi-closed system. If the coliform counts are considered too high in sea or bay pens, efforts should be made to circulate clean sea water through the pens using pumps, paddles or other methods of moving water.

Chemicals added to the water may damage eyes and skin and must be monitored daily. Salinity, when utilized for rehabilitating pinnipeds, may also have an impact on the health of the skin and eyes, as well as the comfort level of the animal, and should be monitored regularly. Emergency chemicals should be on hand such as sodium thiosulfate in case of the accidental hyperchlorination of a system.

2.2.1 Water quality tests

MINIMUM STANDARD

- Measure coliform growth weekly.
- Total coliform counts must not exceed 500 per 100 ml or a most probable number (MPN) of 1000 coliform bacteria per 100 ml water. Fecal coliform counts are not to exceed 400 per 100 ml.
- If the above tests yield results that exceed the allowable bacterial count, then two subsequent samples must be taken to repeat the test(s) where the level(s) is/are exceeded. The second sample is to be taken immediately after the initial test result, while the third sample would be taken within 48 hours of the initial test.
- If the averaged value of the three test results still exceeds the allowable bacterial counts, the condition must be corrected immediately or the animals moved to a contingency facility.
- Maintain pH between 6.5 and 8.5
- Maintain the temperature of the water so that it falls within parameters appropriate for the species, generally between 50-80°F.
- Measure oxidant levels in systems which require use of a chemical disinfectant and/or ozone in the system (for closed systems).

RECOMMENDED

- Maintain pH between 7.2-8.2
- Total Coliforms with blanks and controls, fecal Coliform, fecal Strep, and yeast count performed weekly or as needed

2.2.2 Frequency of testing in closed, semi-open, or open systems**MINIMUM STANDARD**

- Measure water temperature, pH, salinity (if applicable), chemical additives (if applicable) daily in all pools.
- Measure coliform counts weekly; and more frequently at the discretion of the attending veterinarian.

RECOMMENDED

- If ozone systems are used, measure ozone levels regularly in the animal pools. Ozone levels shall not exceed 0.02 mg/liter.
- Test source and discharge water at least once per day (more frequently for “flow through” systems).
- Maintain records for tests with time, level and results – reviewed and signed monthly by the attending veterinarian.

2.3 Chemical Additives

Total chlorine = Free chlorine + combined chlorine.

MINIMUM STANDARD

- Maintain total chlorine below 1.5 ppm, where the combined chlorine shall not exceed 50% of the total chlorine.
- All additives must be recorded.
- pH may be adjusted chemically – for example – pH may be raised with sodium carbonate, or soda ash; or lowered with HCl or CO₂; but not added in a manner that could cause harm or discomfort to the animals.
- Maintain Material Safety Data Sheets (MSDS) and clear signage as well as protocols for appropriate handling equipment for the addition of chemicals.

2.4 Water Circulation

The amount of water turnover through the filtration system in a closed or semi-open system is important to maintain water quality by removing organic waste and particulate matter. Likewise the amount of water movement through an open water pen is also important in the maintenance of water quality. Generally, adequate tidal action will result in the equivalent of two complete water changes per day.

MINIMUM STANDARD

- Maintain sufficient turnover of water through the filtration system in closed or semi-open systems to keep the water quality at or above acceptable limits, with a minimum of two complete water changes per day
- Ensure methods for moving water (water paddles, pumps, spray devices) are available to aerate and move water in open water pens with insufficient flow of tides or water through the enclosures. These methods should be sufficient to provide the equivalent of two water changes per day.

RECOMMENDED

- A minimum full water turnover rate of every four hours for each pool in closed or semi-open systems

2.5 Salinity

Pinnipeds under rehabilitation may be housed in fresh water. However salinity may play a part in eye health, may enhance wound healing, or may be desirable in some other instances. In some cases animals will drink fresh water which may aid in rehydration. Placing animals in water of appropriate salinity shall be left to the discretion of the attending staff in consultation with the attending veterinarian.

2.6 pH**MINIMUM STANDARD**

- pH shall be held in a range between 6.5 to 8.5

RECOMMENDED

- Maintain pH between 7.2 –8.2

2.7 Water Temperature**MINIMUM STANDARD**

- Hold water temperatures within the normal habitat temperature range for the species under rehabilitation or as authorized in writing by the attending veterinarian.
- Provide methods to heat and maintain warm water environments for species that require it, or for debilitated or critically ill individuals that are incapable of maintaining appropriate body temperature
- Monitor temperature of water being heated or cooled.

3.0 QUARANTINE

Pinnipeds brought to a rehabilitation facility have no medical history and may carry diseases communicable to other marine mammals, other animals, or humans. Likewise, these animals are often debilitated and may suffer from a variety of illnesses which may compromise their own immune systems making them susceptible to diseases from other animals. Quarantine facilities must be available and quarantine protocols must be in place for all incoming animals at rehabilitation facilities. NMFS release guidelines, policies, regulations (U.S.C. 50 CFR 216.27)

and the terms and responsibilities under the NMFS Stranding Agreement must be followed whenever animals are released back to the wild.

Direct contact between the general public and pinnipeds undergoing rehabilitation should be avoided because of the zoonotic risk of some organisms carried by marine mammals. There have been documented cases of Brucella, Leptospira, Mycoplasma (Seal Finger), San Miguel Sea Lion Virus, Influenza A, and Sealpox, being passed from pinnipeds to humans.

Listed on the following website (see <http://www.vetmed.ucdavis.edu/whc/mmz/>). are numerous other potentially zoonotic marine mammal pathogens. See also: *2004 UC Davis Wildlife Health Center Report for the Marine Mammal Commission – Assessment of the Risk of Zoonotic Disease Transmission to Marine Mammal Workers and the Public: Survey of Occupational Risks*

NOTE: The Act itself authorizes takes of marine mammals for the protection of public safety.

There shall be sufficient quarantine facilities and space for appropriate quarantine of incoming animals or for holding animals with contagious diseases

3.1 Prevention of animal to animal transmission of diseases

MINIMUM STANDARD

- Quarantine all new animals in a separate dedicated quarantine area and provide pens/pools that can be isolated from the rest of the animal housing areas
- Provide dividers between pens and pools that prevent washdown or splash from moving from one pool or pen to another
- Use dedicated protective clothing for personnel - including eye shields or safety glasses and gloves
- Use foot baths, glove baths, methods to disinfect clothing between handling animals within quarantine area and outside of quarantine area
- Maintain equipment and tools strictly dedicated to the quarantine areas
- Provide sufficient space or solid barriers between animal enclosures to prevent direct contact between animals
- Provide sufficient air turnover in indoor facilities to prevent transmission of disease
- Implement specific quarantine and sanitation procedures to prevent transmission of disease through fomites (clothing, equipment)
 - Thoroughly clean and disinfect buckets, hoses, scales, transport equipment, and cleaning equipment that is moved between animal areas to prevent transmission of disease via fomites
- Place open water pens so effluent is not near water intake
- Require evaluation and written veterinary approval before placing animals together after quarantine period has been met

RECOMMENDED

Provide separate air handling system in indoor facilities
Separate entries to quarantine areas with no crossover with the rest of the facility
Clean and disinfect quarantine areas between uses

3.2 Prevention of domestic animal to marine mammal transmission of disease

- Ensure appropriate fencing and placement of holding pens to prevent direct contact between rehabilitating pinnipeds and domestic animals
- Prohibit personal pets within outermost perimeter of facility
- Require that specific quarantine and sanitation procedures are taken to prevent transmission of disease through fomites such as clothing and equipment.
- Use dedicated carriers for pinnipeds – carriers should not be used for other mammals or birds

3.3 Prevention of wild animal to marine mammal transmission of disease

- Ensure perimeter fencing will prevent wildlife from entering the rehabilitation premises.
- Provide rodent control on the premises.
- Ensure net pens and lagoon areas have sufficient secondary fencing to keep wildlife from coming in direct contact with the animals housed in the net pens.

3.4 Prevention of marine mammal to domestic animal transmission of disease

- Provide appropriate perimeter fencing.
- Require animal personnel to change contaminated clothing and/or disinfect before leaving the rehabilitation premises.
- Require that specific quarantine and sanitation procedures are taken to prevent transmission of disease through fomites such as clothing and equipment.
- Follow appropriate release guidelines.

3.5 Prevention of stranded marine mammal to captive marine mammal transmission of disease

- Train volunteers and staff to follow appropriate quarantine protocols
- Establish quarantine protocols that take into consideration the changing status of the stranded animal.
- Establish traffic flow so that volunteers or staff working with stranded animals do not inadvertently travel into a collection animal area.
- Establish decontamination protocols before volunteers or staff members exposed to stranded animals may enter a collection animal area.
- Establish separate restrooms, showers, changing rooms, food preparation areas, etc. for staff and volunteers working with rehabilitating vs. collection animals.

3.6 Methods to reduce spread of disease from animals housed in open sea/bay pen systems include

- Place pens in a secluded area where wild animals and marine mammals are unlikely to come into direct contact with the animals housed in the sea/bay pens.

- Place a second set of perimeter nets 30 feet from the sea/bay pens to prevent direct contact with wild marine mammals. Nets should be sufficiently rigid to prevent entanglement by mammals or fish.
- Do not place sea/bay pens within 1000 meters any major outflow of storm drains or sewage treatment plants and consider the flow direction or current from these major outflows.
- Place the sea/bay pens 500 meters and downstream from water intake pipes that bring water into facilities that house marine mammals.
- Place pens in an area where there is ample flow-through of tides/currents.
- Ensure the pens are of sufficient size to minimize pathogen build-up. Each pinniped should be housed in a pen that has a minimum depth of half of their body length, and a minimum horizontal dimension of two full body lengths.
- Avoid overcrowded pens. Animals may fight with each other when housed too close together.
- Have equipment to pump or aerate the water in pens that do not have sufficient tidal action to ensure a minimum of two complete water changes per day.
- Place pens in areas where there is sufficient depth to enhance water circulation and reduce pathogen build-up. Daily coliform testing will determine if pathogen build-up exists.
- Place quarantine pens such that tidal action or underwater currents will not flow through sea pens housing healthy animals.

3.7 Evaluation requirements before placing marine mammals together

- Obtain CBC/Chemistries, appropriate cultures, physical examination before moving animals out of quarantine area.
- Review current NMFS recommendations on diseases of concern and reportable disease such as morbillivirus.
- Consider screening for morbillivirus, herpesvirus, brucellosis, leptospirosis, and toxoplasmosis utilizing the most current diagnostic tests available.
- If animals are part of an Unusual Mortality Event, then screening for diseases must be more thorough and in direct coordination with NMFS and through UME coordinators.
- Have contingency plan for animals that are actively infected with or carriers of a reportable disease such as brucellosis, leptospirosis, toxoplasmosis, herpesvirus, and morbillivirus.

3.8 Zoonotic considerations

- Restrict public access and direct contact with pinnipeds due to zoonosis potential and public health hazard of non-trained individuals interacting with sick and injured marine mammals.
- Train staff and personnel about how to prevent contracting zoonotic diseases.
- Train staff and personnel working directly with stranded pinnipeds how to recognize signs of zoonotic disease.
- Train staff on the basics of sanitation and properly handling contaminated equipment.

- Provide appropriate safety equipment such as protective clothing, eye protection and face masks to all staff that may be exposed to zoonotic diseases.
- Provide eye flushing stations as used with HAZMAT or normal saline bottles to irrigate the eyes.
- Staff with open wounds shall not handle animals carrying potentially infectious diseases without appropriate precautions to protect their wound(s).

3.9 Pre-release guidelines

- Pre-release health screens and serologic requirements are determined by the NMFS Regional Stranding Coordinator and the Marine Mammal Health and Stranding Response Program.

4.0 SANITATION

4.1 Primary enclosure sanitation

MINIMUM STANDARD

- Remove animal and food waste in areas other than the rehabilitation pool from the rehabilitation enclosure at least daily, and more often when necessary to prevent contamination of the marine mammals contained therein and to minimize disease hazards.
- Remove particulate animal and food waste, trash, or debris that enter rehabilitation/exercise pens or pools at least once daily, but as often as necessary to maintain water quality and to prevent increased health hazards to the marine mammals that use the pools.
- Remove trash and debris from pools as soon as it is noticed, to preclude ingestion or other harm to the animals.
- Clean the walls and bottom surfaces of the rehabilitation/exercise pens and pools as often as necessary to maintain a clean environment and proper water quality.
- Ensure appropriate disinfectants mixed to recommended dilutions are utilized to clean pens, equipment, utensils, and feed receptacles and to place in foot baths.
- Rotate disinfectants to prevent bacterial resistance.
- Prevent animals from coming in direct contact with disinfectants or aerosol from spray or cleaning hoses (i.e water splashed from floor).

RECOMMENDED

- Empty and allow pools to dry once each year but dry and hyperchlorine pool bottoms and walls and haul-out areas after each use by sick pinnipeds

4.2 Sanitation of food preparation areas and food receptacles

- Use separate food preparation areas and supplies for rehabilitation vs. collection animals.
- Clean food containers such as buckets, tubs, and tanks, as well as utensils, such as knives and cutting boards, or any other equipment which has been used for holding, thawing or preparing food for marine mammals after each feeding, and sanitize at least once a day. Equipment should be cleaned with detergent and hot water, sanitized and dried before reuse.

- Clean kitchens and other food handling areas where animal food is prepared after every use, and sanitize at least once weekly using professionally accepted sanitation practices.
- Store substances such as cleaning and sanitizing agents, pesticides and other potentially toxic agents in properly labeled containers away from food preparation areas.
- Clearly post MSDS “right to know” documents for staff utilizing cleaning and animal treatment chemicals and drugs.

5.0 FOOD, HANDLING, AND PREPARATION

During rehabilitation food for marine mammals shall be wholesome, palatable, free from contamination, and of sufficient quantity and nutritive value to allow the recovery of the animals to a state of good health. Live fish may be fed during rehabilitation but preferences should be given to native prey species. Live fish may contain parasites which could infect compromised animals. Feeding regimens should simulate natural patterns in terms of frequency and quantity to the extent possible while following a prescribed course of medical treatment. Most pinnipeds feed several times during a given day

5.1 Diets and Food Preparation

MINIMUM STANDARD

- Prepare the diets with consideration for age, species, condition, and size of marine mammals being fed.
- Feed pinnipeds a minimum of twice a day, except as directed by a qualified veterinarian or when following professionally accepted practices.
- Diets should be reviewed by a nutritionist or a veterinarian.
- Train staff to recognize good and bad fish quality.
- Feeding live fish may be required for release determination. See NMFS/FWS Release Standards for more information regarding feeding live fish.
- Food receptacles should be cleaned and sanitized after each use. Food preparation and handling should be conducted so as to minimize bacterial or chemical contamination and to ensure the wholesomeness and nutritive value of the food.

5.2 Food Storage and Thawing

- Frozen fish or other frozen food must be stored in freezers which are maintained at a maximum temperature of 0° F (-18° C).
- The length of time food is stored and the method of storage, as well as the thawing of frozen food should be conducted in a manner which will minimize contamination and which will assure that the food retains optimal nutritive value and wholesome quality until the time of feeding.
- Freezers should only contain fish for animal consumption. Human food or specimens should not be placed in the fish freezer.
- Experienced staff should inspect fish upon arrival to ensure there are no signs of previous thawing and re-freezing, and check temperature monitoring devices in the transport container. Fish should be refused if temperature fluctuations occurred during transport.

- Freezers shall be of sufficient size to allow for proper stock rotation.
- All foods shall be fed to the marine mammals within 24 hours following the removal of such foods from the freezers for thawing.
- If the food has been thawed under refrigeration it must be fed to marine mammals within 12 hours of complete thawing.
- When fish is thawed in standing or running water, cold water must be used to prevent excess bacterial growth.
- To ensure optimal quality of the fish, and to prevent bacterial overgrowth, do not allow fish to reach room temperature or sit in direct sunlight.
- The thawed fish shall be kept iced or refrigerated until a reasonable time before feeding. This time will vary with ambient temperature.
- Prepared formula should be fed immediately or refrigerated and fed to the marine mammals within 24 hours of preparation. Formula, once heated to an appropriate temperature for a feed, shall be discarded if it is not consumed within one hour.

RECOMMENDED

Calculate kilocalories of each type of fish or food items fed to each animal daily
Conduct food analysis for protein, fat and water content of each lot of fish used

5.3 Supplements**MINIMUM STANDARD**

- Each animal shall receive appropriate vitamin supplementation which is sufficient and approved in writing by the attending veterinarian.
- Salt supplements shall be given to pinnipeds housed in fresh water as necessary and as approved by the attending veterinarian.

5.4 Feeding

Food, when given to each marine mammal individually or in groups, must be given by an employee or trained personnel who has the necessary training and knowledge to assure that each marine mammal receives an adequate quantity of food to maximize its recovery or maintain good health. Such personnel is required to recognize deviations in each animal being rehabilitated such that food intake can be adjusted accordingly.

5.5 Public feeding**MINIMUM STANDARD**

- Public feeding is not allowed for animals that are being rehabilitated.
- Feeds may be conducted only by qualified, trained rehabilitation staff members.

5.6 Feed records**MINIMUM STANDARD**

- Maintain feed records for each individual animal noting the individual (not an estimate) daily consumption by specific food type.
- Weigh food before and after each feeding and record the amount consumed.
- Weigh the animal as practical, keeping in mind that obtaining the weight of the animal may be stressful.
- If weighing the animal is not an option, obtain the girth measurement at the level of the axilla if possible.

6.0 VETERINARY MEDICAL CARE

All rehabilitation facilities shall have an attending veterinarian. The attending veterinarian is critically involved in making decisions regarding medical care as well as housing and husbandry of resident and incoming pinnipeds.

6.1 Veterinary Experience

MINIMUM STANDARD

The attending veterinarian shall:

- Be available to examine animals on a regular schedule and emergency basis.
- Be available to answer veterinary questions on a 24 hour basis.
- Have marine mammal experience or be in regular consultation with a veterinarian who has marine mammal experience.
- Be licensed in the state where they are practicing.
- Have access to a list of expert veterinarians to contact for assistance.
- Have a minimum skill level and be able to draw blood and give injections to the species most commonly encountered at the rehabilitation center.
- Have contingency plan for veterinary backup.
- Have a drug license and the ability to obtain necessary medications for the animals housed at that rehabilitation facility.
- Be able to conduct a full post-mortem exam on all species of pinnipeds treated at the facility.
- Be knowledgeable and able to perform pinniped euthanasia.
- Be knowledgeable about species-specific pharmacology.
- Must certify in writing that animals scheduled for release are likely to survive and are free of known communicable diseases.
- Must certify in writing that animals are fit for transport.

RECOMMENDED - All of the above plus

- Maintain a membership in the International Association for Aquatic Animal Medicine.
- Complete a course which offers basic medical training with marine mammals such as Seavet, Aquavet or MARVET.
- Have at least one year of clinical experience outside of veterinary school.
- Have access to the "Handbook of Marine Mammal Medicine" 2nd Edition.

- Have basic hands-on veterinary experience with the species most frequently rehabilitated at the facility.
- Be full time employees or the contract veterinarian of record at facilities managing over 30 pinniped cases per year.

6.2 Veterinary Program

MINIMUM STANDARD

- Veterinary care for the animals must conform with the State Veterinary Practice Act for the state in which the facility is located.
- Veterinary care of the animals must be performed by, or under the supervision of a veterinarian as determined by the State Veterinary Practice Act.
- Standard operating procedures shall be reviewed and signed off by the veterinarian every 6 months and may be reviewed by NMFS as part of the NMFS Stranding Agreement or as a part of inspections.
- Staff caring for animals should be sufficiently trained to assist with veterinary procedures under the direction of the veterinarian.
- Institutions must abide by all relevant laws governing veterinary medicine
- Veterinary decisions shall be based on “best practices” based on informed veterinary opinion and experts in cetacean medicine.
- A schedule of veterinary care which includes a review of husbandry records, visual and physical examinations of the animals and a visual inspection of the facilities should be implemented.
- A health and safety plan for the staff shall be written and accessible at all times. It shall be reviewed by the veterinarian annually and may be required as part of the NMFS Stranding Agreement. Staff will be familiar with the plan. The plan shall include protocols for managing bite wounds.

The following reports may be requested annually by NMFS as required under the NMFS Stranding Agreement or as a part of inspections:

- SOP reviews
- Health and Safety Plan reviews
- Animal acquisitions and dispositions
- NOAA Form 89864, OMB#0648-0178 (Level A data)
- NOAA Form 89878, OMB#0648-0178 (Marine Mammal Rehabilitation Disposition Report)
- Case summaries for any rehabilitation performed at a facility, including narrative descriptions of the cases as well as spreadsheets of treatments, blood values, etc.

7.0 LABORATORY TESTS AND FREQUENCY OF TESTING

Recommendations for tests will be issued each year by the NMFS stranding coordinator in each region as outlined in the Marine Mammal Health and Stranding Response Program.

MINIMUM LABORATORY TESTING

- CBC/Serum Chemistry - All animals shall have a minimum of two blood samples drawn for CBC with differential and serum chemistry; upon admission and prior to release (see NMFS Release Guidelines).
- Fecal analysis for parasites - Fecal tests for parasites shall be run upon admission of each animal at the discretion of the attending veterinarian.
- Serology as necessary for release determination based on direction of the NMFS stranding coordinator and the Marine Mammal Health and Stranding Program each year and for additional clinical diagnosis as deemed appropriate by the attending veterinarian.
- If serology is positive for pathogens of concern NMFS must give final sign off before animal is released.
- Measure body weight, girth and length upon admission, and within one week of release/placement.
- The attending veterinarian or a trained staff member shall perform a complete necropsy on every animal that dies within 24 hours of death.
- Perform histopathology on select tissues from each animal that dies
- Culture and other diagnostic sampling shall be conducted as directed by the attending veterinarian to determine the cause of stranding or death
- Contact NMFS for additional laboratory test requirements in all cases of unusual mortality outbreaks or disease outbreaks. More complete testing may be required for diseases of concern.
- Serologic assays may only go to labs that have validated tests approved by NMFS, especially for release decisions or determinations
- Notify NMFS within 24 hours of diagnosis of reportable disease.
- NMFS must be provided adequate time and information (including vet certificate of health) before animal is released in all cases as directed in 50 CFR 216.27 (see NMFS/FWS Release Standards).

RECOMMENDED

- Obtain CBC/Serum Chemistry with electrolytes on admission, within the week prior to release, and every other week during rehabilitation if restraint for sampling is not detrimental to the health of the animal.
- Draw blood more frequently at the discretion of the veterinarian.
- Obtain weight measured on admission, just before release, and weekly for growing pups and underweight animals.
- Weights should be measured monthly for all animals unless the stress of capturing the animal to weigh it outweighs the benefits of the data
- If the animal dies during rehabilitation, a complete necropsy should be performed by a veterinarian or a pathologist.
- Full histopathology done on tissues from each animal that dies of suspected or apparent infectious disease should be completed.
- Bank 1cc of serum per blood draw in -80°F freezer
- Bank "buffy coat" from heparinized plasma (green top) tube in -80 °F one per animal

8.0 RECORD KEEPING AND DATA COLLECTION

Record keeping is an essential part of the rehabilitation process. Not only do accurate and complete medical records for each stranded pinniped allow the staff to provide consistent and optimal care for each animal, but retrospective records help scientists and veterinarians to make better evaluations on how to treat individuals as well as more accurate population health assessments.

8.1 Record Keeping

MINIMUM RECORDS:

- Record and report “Level A” , and disposition reports as advised by Regional Coordinator and Marine Mammal Rehabilitation Disposition Report (NOAA 89-878, OMB #0648-0178) as in accordance with the NMFS Stranding Agreement
- Maintain and update individual medical records daily on each animal at the rehabilitation center.
- Individually identify each animal with unique identifier
- Keep an accurate description of the animal, including identification/tag number, date and location of stranding, sex, weight, and length at stranding.
- Subjective, objective, assessment and plan (SOAP) based records are preferred
- Include food intake and medication administered to each animal in the records each day.
- Weight
 - Recorded weekly for underweight pinnipeds or pups, and more often if the attending veterinarian feels it is necessary to properly care for the animal.
 - Recorded on admission and release for larger pinnipeds.
- Record all treatments, bloodwork, test and results and daily observations in the medical records.
- Maintain individual medical records for each animal. Medical records remain on site where the animal is housed and are available for NMFS review upon request as stated in the NMFS Stranding Agreement.
- Hold medical records for a minimum of 15 years on site.
- Maintain up to date water quality records.
- Maintain life support system maintenance records.
- Maintain records of water quality additives.

RECOMMENDED RECORD KEEPING - All of the above plus;

- Collect a full set of standard morphometrics prior to release.
- Obtain photographic documentation of the animal, lesions, identifying marks.
- Determine caloric value of daily food intake calculated and recorded for each animal.
- Obtain daily weight of pups.
- Obtain monthly weights of larger pinnipeds (where the stress of capture to weigh does not adversely affect the rehabilitation efforts).
- Maintain food acquisition and analysis records.
- Maintain “paper copy” archive of required NMFS records.

8.2 Data Collection

MINIMUM STANDARD

- Written documentation of the medical history, food and observation records must be maintained.
- NMFS Required Forms to be completed:
 - NOAA Form 89864, OMB#0648-0178 (Level A data)
 - NOAA Form 89878, OMB#0648-0178 (Marine Mammal Rehabilitation Disposition Report)

RECOMMENDED

- Maintain computerized documentation with hard copies.
- Must have the ability to network with other institutions.
- Maintain real-time accessible compiled comparative data.

9.0 EUTHANASIA

- Each institution must have a written euthanasia protocol signed by the attending veterinarian.
- Persons administering the euthanasia must be knowledgeable and trained to perform the procedure.
- Maintain a list of individuals authorized to perform euthanasia signed by the veterinarian.
- Euthanasia shall be performed in a way to minimize distress in the animal.
- Refer to both American Veterinary Medical Association euthanasia standards and the CRC Press Handbook of Marine Mammal Medicine.
- Appropriate drugs for euthanasia in appropriate amounts for the largest species admitted to the facility shall be maintained in stock on site in an appropriate lockbox or under the control of a licensed veterinarian with a current DEA license.
- Drugs for euthanasia shall be kept with an accurate inventory system in place.
- DEA laws and regulations and State Veterinary Practice Acts must be followed when using controlled drugs
- NMFS may request this information (protocols and DEA #) as part of the NMFS Stranding Agreement

10.0 HEALTH AND SAFETY FOR PERSONNEL

There shall be a health and safety plan on site at each rehabilitation facility that identifies all health and safety issues that may be factors when working closely with wild marine mammals. The plan should identify all potential zoonotic diseases as well as including safety plans for the direct handling of all species and sizes of pinnipeds seen at that facility.

MINIMUM STANDARD

- Identify all potential zoonotic diseases in a written document available to all personnel.
- Include safety plans for the direct handling of all species and sizes of pinnipeds seen at that facility.

11.0 CONTINGENCY PLANS

Contingency plans shall be in place at each facility and may be required by NMFS as part of the NMFS Stranding Agreement. NMFS may require approved variances or waivers prior to planned

projects such as construction. These plans should address in detail the operation of the facility and care of the animals under the following conditions:

- Inclement weather plan, including a hurricane/big storm plans where appropriate;
- Construction in the vicinity of the animal rehabilitation pools recognizing the potential and documented adverse impacts of construction on cetaceans, and including specific reference to how noise, dust, debris, and construction worker access will be controlled, how and how frequently animal health will be monitored, and specific criteria for when construction shall be halted or the animals will be moved to another site out of the construction area if the animals appear to be adversely impacted;
- Power outages, including plans of how to maintain frozen fish stores and life support systems;
- Water shortages;
- “Acts of God” plan which may include floods, earthquakes, hurricanes or other unpredictable problems known to occur on occasion in the region where the facility is located.

SECTION 12.0 VIEWING

NMFS Regulation, U.S.C. 50 CFR 216.2(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR is “an activity that provides opportunity for the public to view living marine mammals at a facility holding marine mammals captive”. Only remote public viewing will be allowed and only when there is no possible impact of the public viewing on the animals being rehabilitated, a variance will be required by NMFS for facilities planning to offer public viewing of any cetaceans undergoing rehabilitation.

SECTION 13.0 TRAINING AND DECONDITIONING BEHAVIORS

Basic behavioral conditioning of wild pinnipeds for husbandry and medical procedure may be warranted during rehabilitation as long as every effort is made to limit reinforced contact with humans. Such conditioning may reduce stress for the animal during exams and acquisition of biological samples, as well as improve the ability to assess the appetite and ensure each animal in a group receives the appropriate amount and type of diet and medications. In some cases, extensive contact with humans, including training, may benefit resolution of the medical case by providing mental stimulation and behavioral enrichment, and may facilitate medical procedures. The relative costs and benefits of training should be evaluated by the staff veterinarian, and the likelihood of contact with humans following release should be considered.

Behavioral conditioning of pinnipeds must be done for the shortest time necessary to achieve rehabilitation goals and is to be eliminated prior to release such that association of food rewards with humans is diminished. If an animal has become accustomed to hand-feeding the animal may approach humans after release. Therefore, these behaviors should be deconditioned before the animals can be considered for release. Most behaviors will extinguish through lack of reinforcement, but some may require more concentrated efforts. The success of deconditioning can be assessed through observations of the extinguishing of undesirable behaviors.

Training for research that is above and beyond the scope of normal rehabilitation practices can be approved on a case-by case basis under a NMFS scientific research permit. An exception can

be made if the attending veterinarian, facility, and NMFS officials all agree that the research will not be detrimental to the animals' health and welfare and will not impede their ability to be successfully released back to the wild.